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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,144	10/03/2001	Cormac E. Herley	1026-048/MMM 183200.1	2134

27662 7590 08/28/2009

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ART UNIT	PAPER NUMBER
2624	

MAIL DATE	DELIVERY MODE
08/28/2009	PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CORMAC E. HERLEY

Appeal 2006-003217
Application 09/970,144
Technology Center 2600

Decided: August 28, 2009

Before KENNETH W. HAIRSTON, ROBERT E. NAPPI,
and ELENI MANTIS MERCADER, *Administrative Patent Judges*.

MANTIS MERCADER, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant seeks our review under 35 U.S.C. § 134(a) of the Examiner's final rejection of claims 1-8, 11-20, 22-29, and 31-33. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

INVENTION

Appellant's claimed invention is directed to employing a digital imaging device camera with VGA resolution employing a multi-frame reconstruction algorithm which can achieve a 4x improvement in resolution in each dimension (Spec. 2: ¶ [0005]). The multi-frame reconstruction entails mapping non-uniform samples from multiple images to a uniform or regular grid (Spec. 9: ¶ [0038]).

Claim 1, reproduced below, is representative of the subject matter on appeal:

1. A text document capture method for digitizing a text document segment in printed form, comprising:

imparting a continuous lateral jittering between a digital imaging device and the text document;

obtaining multiple laterally-displaced digital images of all of the text document segment during the continuous lateral jittering and determining fractional pixel offset positions at which each image was obtained;

forming from the multiple laterally displaced images an enhanced resolution representation of the text document as a function of the fractional pixel offset positions;

and

de-blurring the enhanced resolution representation of the text document by thresholding the enhanced resolution representation into either one of two pixel luminance levels, representing foreground and background pixels, with the foreground pixels corresponding to text in the text document.

THE REJECTION

The Examiner relies upon the following as evidence of unpatentability:

Crinon	US 6,285,804 B1	Sep. 04, 2001 (filed Dec. 21, 1998)
Steinkirchner	US 5,392,365	Feb. 21, 1995

The following rejection is before us for review:

The Examiner rejected claims 1-8, 11-20, 22-29, and 31-33 under 35 U.S.C. § 103(a) as being unpatentable over Crinon in view of Steinkirchner.

Appellant argues the art rejection of claims 1-8, 11-20, 22-29, and 31-33 as a group with independent claims 1, 13, 25, and 33 as representative (App. Br. 9-15).[1] Although Appellant nominally argues independent claims 13, 25, and 33 separately (App. Br. 12-15), these arguments merely reiterate the same arguments presented for claim 1. Accordingly, we group claims 1-8, 11-20, 22-29, and 31-33 together and select claim 1 as representative. Thus, claims 2-8, 11-20, 22-29, and 31-33, stand or fall with claim 1. *See* 37 C.F.R. § 41.37 (c)(1)(vii) (2004). We note that the Examiner withdrew the rejections made under 35 U.S.C. § 112, second paragraph (Ans. 12), and, thus, we do not address Appellant's arguments with respect to these rejections (App. Br. 6-8).

[1] Only arguments made by Appellant have been considered in this decision. Arguments which Appellant could have made but did not make in the Brief have not been considered and are deemed waived. *See* 37 C.F.R. § 41.37(c)(1)(vii) (2004).

OBVIOUSNESS

ISSUE

Appellant admits that Crinon, much like Appellant's disclosed method, teaches a method that makes use of a plurality of images having potential offsets measured in fractional pixel instances (App. Br. 10). Appellant however asserts that in stark contrast to the Crinon reference, rather than computing global motion models, deriving motion vectors from the motion model for relating a reference image to every other image, mapping image pixels to "'inter-pixel positions'" which are in turn used to map pixel intensities to "'high-resolution grid points,'" the Appellant simply computes enhanced resolution images as "*a direct function of the fractional pixel offset positions*," as described and claimed (App. Br. 10). Appellant asserts that the construction of high resolution images is based on fractional pixel offsets "*without the need to compute the motion models*" as disclosed in Crinon (Reply Br. 5). Appellant explains that the function includes a weighted combination of multiple image pixel samples that are nearest the enhanced resolution sample (App. Br. 10).

The Examiner responds that based on Appellant's arguments stating that Crinon teaches mapping image pixels to "'*inter pixel positions*'" which are in turn used to map pixel intensities to "'*high resolution grid points,*'" Appellant does not dispute that Crinon creates an enhanced resolution image from low resolution images "'based on'" fractional pixel offset positions (Ans. 12-13). The Examiner interpreted the phrase "*as a function*" to be "'based on'" and not to mean an equation (Ans. 12-13), wherein the equation is the weighted sum of the image values of the nearest image pixel values as argued by Appellant (App. Br. 10). The

Examiner nonetheless states that Crinon teaches that four nearest pixel values are taken and the fractional pixel offset of each is used to determine the weighting factor (Ans. 13-14).

The issue, then, is whether Appellant has shown that the Examiner erred by finding that Crinon teaches "forming . . . an enhanced resolution representation . . . as a function of the fractional pixel offset positions" as recited in claim 1.

FINDINGS OF FACT

The following relevant findings of fact (FF) are supported by a preponderance of the evidence:

1. Independent claims 1, 13, 25, and 33 only require "a function of the fractional pixel offset positions" and the claim language is silent as to whether this is a *direct* or *indirect* function (claims 1, 13, 25, and 33). The claims use the transitional term "comprising" (claims 1, 13, 25, and 33).
2. Crinon teaches deriving motion vectors 22 from a parametric global motion model (col. 3, ll. 53-58)
3. Appellant admits that Crinon teaches mapping image pixels to "'inter-pixel positions'" which are in turn used to map pixel intensities to "'high-resolution grid points'" (App. Br. 10), and that Crinon's method includes a plurality of images having potential offsets measured in fractional pixel distances (App. Br. 10).
4. Crinon teaches that the interpolation process (i.e., function) makes use of the associated distance values of the closest pixels (i.e., four pixels 24 shown in

the 4 distinct squares at the right section of Fig. 5) to calculate the sample value at the high resolution grid point 20 (col. 5, ll.45-49).

5. Crinon teaches that the interpolation process includes a weighing factor specifying the contribution of the associated sample value in the final image value at grid point 20 (col. 5, ll. 49-53).
6. Crinon further teaches that the motion vector 22(2) mapped to the image 16B at time t=to+2 has an inter-pixel position 24B closest to the existing pixel position 26B (col. 5, ll. 53-55).
7. Crinon teaches that the distance di between position 24B and 26B is the smallest distance for any one of the motion vectors 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (col. 5, ll. 55-58).
8. Crinon teaches that the pixel intensity value for grid location 20A is derived using spatial interpolation (col. 5, ll. 58-59).

PRINCIPLES OF LAW

The Examiner bears the initial burden of presenting a prima facie case of obviousness, and Appellant has the burden of presenting a rebuttal to the prima facie case. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Appellant has the burden on appeal to the Board to demonstrate error in the Examiner's position. *See Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006).

The transitional term "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997).

Although claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

ANALYSIS

At the outset, we note that Appellant's assertion (App. Br. 10) that the claims require "*a direct function of the fractional pixel offset positions*," is misplaced as the claim language only requires "a function of the fractional pixel offset positions" and the claim language is silent as to whether this is a *direct* or *indirect* function (FF 1). Thus, the claim language does not preclude an indirect function for determining the factional pixel positions. Furthermore, the additional features of computing global motion models and deriving motion vectors from the motion model for relating a reference image to every other image as taught by Crinon (FF 2) are not precluded because the transitional term "comprising" is inclusive or open-ended and does not exclude additional, unrecited elements (FF 1). *See Genentech*, 112 F.3d at 501.

Appellant admits that Crinon teaches mapping image pixels to "'inter-pixel positions'" which are in turn used to map pixel intensities to "'high-resolution grid points'" and that Crinon's method includes a plurality of images having potential offsets measured in fractional pixel distances (FF 3). Thus, Appellant admits that Crinon teaches "forming . . . an enhanced resolution representation" (i.e., mapping pixels to the high-resolution grid) "as a function of the fractional pixel offset positions" (i.e., by using the potential offsets measured in fractional distances).

Appellant explains that the function includes a weighted combination of multiple image pixel samples that are nearest the enhanced resolution pixel (App. Br. 10). We note that the claim does not recite "*a weighted combination of multiple (e.g., 3) image pixel samples that are nearest the enhanced resolution pixel*." So even if "function" meant "equation" the scope of the claim is not limited to the specifics recited in the Specification as Appellant chose not to claim the specifics. In other words, although claims are interpreted in light of the specification, limitations from the specification are not read into the claims. *See Van Geuns*, 988 F.2d at 1184 (Fed. Cir. 1993).

Furthermore, while we agree with the Examiner that under the broadest reasonable interpretation "*as a function*" means "'based on'" (Ans. 12-13) and not "an equation," nonetheless Crinon teaches what Appellant describes as a function as will be illustrated *infra*.[2]

Crinon teaches that the interpolation process (i.e., function) makes use of the associated distance values of the closest pixels (i.e., four pixels 24 shown in the 4 distinct squares at the right section of Fig. 5) to calculate the sample value at the high resolution grid point 20 (FF 4). Crinon teaches that the interpolation function includes a weighing factor specifying the contribution of the associated sample value in the final image value at grid point 20 (FF 5). Crinon further teaches that the motion vector 22(2) mapped to the image 16B at time t=to+2 has an inter-pixel position 24B closest to the existing pixel position 26B (FF 6). Crinon teaches that

[2] We note that while Appellant states that "as a function" means "based on" (Reply Br. 6) and not an equation, Appellant nonetheless focuses on the calculated weighted sum (i.e., an equation) (Reply Br. 5-6).

the distance di between position 24B and 26B is the smallest distance for any one of the motion vectors 22 (i.e., 4 motion vectors shown in Fig. 5) at high resolution point 20A (FF 7). Crinon teaches that the pixel intensity value for grid location 20A is derived using spatial interpolation (FF 7). Accordingly, Crinon teaches an interpolation function that includes a weighted combination (i.e., weighing factor specifying the contribution of the associated sample value in the final image value at grid point 20) of multiple pixels (i.e., four pixels 24 shown in Fig. 5) that are nearest to the enhanced resolution sample 20A.

For the foregoing reasons, Appellant has not persuaded us that the Examiner erred in rejecting claim 1 and claims 2-8, 11-20, 22-29, and 31-33 which fall with claim 1.

CONCLUSION

Under 35 U.S.C. § 103, Appellant has not shown that the Examiner erred by finding that Crinon teaches "forming . . . an enhanced resolution representation . . . as a function of the fractional pixel offset positions" as recited in claim 1, and similarly recited in claims 13, 25, and 33. Similarly, Appellant has not persuaded us that the Examiner erred in rejecting claims 2-8, 11-12, 14-20, 22-24, 26-29, and 31-32 which fall with claim 1.

ORDER

The decision of the Examiner to reject claims 1-8, 11-20, 22-29, and 31-33 under 35 U.S.C. § 103, is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

KIS

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